

EXPLANATORY

TABLES AND PLATES .

PLATE I. TABLE 6.

THE AVERAGE NATURAL PROVO RIVER IN THE UTAH LAKE VALLEY:

Table 6 is a condensed form of Tables 21,22,23,24,25, and 26.

Table 6 is platted and forms PLATE I.

The Natural Provo River as herein designated and derived, is the total flow of the waters of Provo River and its tributaries in Utah Valley down to the Diversion of the Fort Field Canal, about two miles West of Provo City,Utah.

The total flow is obtained by adding the discharge of the several diversions, and the ~~an~~ quantity passing the Fort Field Canal. Measurements of the several canals are made at their respective rating stations, which are located just above the first lateral of the canal. These rating stations have remained in approximately the same location since the year 1902, except the Provo Bench rating flume which for a period after 1902 was located near the heading of the canal.

Since the year 1905 a substantial "inflow" has existed between the United States Geological Survey station and the points of measurement in the Utah Valley. This inflow has been platted upon prints of Mean Inflow Curve as submitted in 1916 Report, through these points a curve has been drawn and the column 'inflow curve' been taken directly from the sheet. Generally the curve fits very closely to the points during the season of normal flow, there are however a few instances in which the points are remote from the line, this ~~in observed cases~~ is attributed to unsettled conditions, or during a storm period, or immediately after a storm when the tailings were still flowing to river below the U.S.G.S. Station and above the points of measurement, where this has been observed the normal line of curve has been followed, and the excess-- tailings and storm contributions below the U.S.G.S. Stations -- has been disregarded. That is, all tailings and storm contributions below the U.S. G.S. Stations have been omitted from the tables and curves.

During the flood water period of April, May, and June, the Mean Inflow curve has been added to the observed flow at the Station. During these months but few measurements have been made showing totals in the valley, and an individual curve for each year is not available, however, the curve used is considered conservative, and if disregarded would represent but a small percentage of the total discharge.

Beginning in July 1910 The Provo Reservoir Company and Sego Irrigation released from Storage Reservoirs at the head of river quantities of impounded water, and have continued during July, August, and September of each year since to release, comingle, and recover such storage water. They and also the Utah Power & Light Company have comingled the greater portion of the waters issueing from the Ontario Drain Tunnel with the waters of Provo River, and have recaptured the same at their diversions in Utah County.

During the period of record of storage and tunnel water, these particular quantities have been styled unnatural flow, and in all of the tables has been deducted from the observed discharge.

So, that, The Natural Provo River, is the quantity of water available at the several ratings stations of the

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diversions in Utah Lake Valley.

Referring to any day in Tables 21, 22, or 23, the observed discharge at the U.S.G.S. Station is tabulated for each of the years. The average for each individual day is obtained and to this is added the mean inflow for that particular day, this result is given in the last column as the average for that day for the years as listed at the top of the page.

And Tables 24, 25, and 26 are made up considering each day as an individual, for example referring to Table 24; and Table 287.

On the tenth day of July, 1918, the observed discharge of the river at the station was 253 c.f.s., of the fork 31 c.f.s. a total of 284 at the stations in Provo Canyon, to this is added the inflow of 57 c.f.s., making a total quantity in the Utah Valley of 341 c.f.s. from this is subtracted the storage and tunnel water of 44 c.f.s., leaving 297 c.f.s. as the Natural River in Utah Valley for that date. This quantity is then advanced to its proper place in Table 24. Each of the days for July, August and September are treated in this manner forming the Tables 24, 25, and 26. The averages of these quantities are given in the column at the right, and appear as the average for each day in the period. The last column referred to is compiled in Table 6 in compact form.

At the bottom of Tables 24, 25, and 26, is the Total, the Maximum, the Minimum, and the Mean of each month in each year, on the right is the average of the totals, the Maximum of the average, the Minimum of the average, and the Mean for the month for the period, and immediately below is the average of the Maxima (monthly) and the average of the Minima (Monthly) of all the years.

TABLE 7.
PLATE VI.

Table 7 is a condensed form of the Typical Natural Provo River 1905-1918 inclusive.

Table 7 is platted upon and forms PLATE VI.

The typical discharge of a stream is the volume of discharge that is substantial and dependable, it is the average flow stripped of abnormal quantities, with protruding peaks cut off, materially showing a lighter discharge curve in the periods of flood waters and time of fluctuating heads, it is a reduction of the larger volumes in a greater degree than the raising of the small one. It modifies the irregularities of discharge curve by referring all points to a period constant. It is the geometric mean of two quantities,--the second root of the product of two magnitudes,-- in this instance the average flow and the average of the ten day minima.

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For example; referring to Table 25:

Reading from 1905 to 1918 the minimum in each year for the 1st to 10th of August is as follows: 199,310, 462,309, 378,318,275, 301,266,395,234,364,381 and 250, a total of 4442 and an average of 317. This quantity 317 is the factor for each of these ten days, and the average found in the column at the right is the other factor for that particular day, that is the typical for August 10th is the square root of $317 \times 327 = 322$ c.f.s.

This process has been followed for each of the in July, August and September. In April, May, and June, the ten day minimum has been obtained from the observed flow, that is the average, and to this is added the average of the inflow for that period of days.

It is well to observe that the curve following the ten day minimum, as shown superimposed upon Plate VI, departs from the Typical Discharge Curve in the flood water season, denoting a period of fluctuations, and during the normal flow it hugs closely to the line of discharge denoting constancy.

TABLE 8.

TABLE 9.

PLATE XI.

Tables 8 and 9 is condensed form of Median and Median Zone of Provo River 1905 to 1918 inclusive.

The Median of Tables 8 and 9 is platted upon and forms PLATE XI.

The Median line of discharge of a stream occupies a position, upon either side of which there are an equal number of volumes, -- the same number of observations greater as less. Considering an odd number of years it is the particular quantity having in the other years on that date the same number of quantities greater as less. In a period of an even number of years as in this case -- fourteen, it is the average of the least of the seven large volumes and the greatest of the seven smallest volumes, each of these being the limits of the median zone.

For example referring to Table 25 and date of August 15th.

The seven large volumes are 423,358,377,317,354,356,, and 407, the least of which is 317.

The seven smallest quantities are 200,267,274, 311,264, 243, and 265, the greatest of which is 311.

And the average of 317 and 311 is 314, the median for this day, and 317 is the maximum limit of median zone having seven years below and six above. And 311 is the minimum limit of zone having seven years above and six below.

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TABLE 10. TABLE 280. TABLE 16. TABLE 17.
PLATE X. PLATE IX.

Table 10 is a tabulation of the quantities of water in second feet as found by observation on the dates shown, and the apportionment to the several parties by the decision as rendered and amended. It follows the sheets of distribution, the exact discharge of the Provo City Waterworks was not disclosed until session of Court in September, and the quantities appear as they were assumed at the time, however the difference in total represents but a small quantity.

Using these points of observation and the daily discharge of Provo River at the U.S.G.S. Station, and also deducting from Table 280 the inflow in canyon and valley by straight lines from point to point, Tables 16 and 17 are formulated showing the quantities day by day, and from these tables Plate IX is platted.

And Plate IX, as shown by Tables 16 and 17 is reduced to a percentage relation of the quantities received to the award, and is platted upon and forms the first section of Plate X.

TABLE 11:

Table 11 is tabulated form of awards under decision as modified assuming Provo City Town Lots at 500 acres, and also assuming the average flow of Springs awarded to Provo City to be 6.00 c.f.s. This Table is platted and superimposed upon Plate VI. It is well to observe in this connection that the quantities represent net award, and also compare with Table 10. From observations made to date, no great difference will exist between the total gross award and the total net award, and the quantities lost in transit will be offset by the inflows along the courses of the canals.

TABLES 13 and 14.

Tables 13 and 14 are formulated using the typical River and dividing the mean inflow curve as shown between canyon and valley. This division at some periods of the season may be in error a small quantity, but when compared to the total quantity under consideration it is a very small percentage.

The percentage of quantities under a typical river is derived for canyon and valley rights and platted as the third section of Plate X. Observe that Table 13, begins at the date when all the rights are receiving their full award and continues through the critical period.

TABLE 15.

Table 15 is formulated same as Tables 13 and 14, except the average river is used. The same may be said of this table as Tables 13 and 14.

Table 15 is platted as the second section of Plate X.

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PLATE II.

Plate II is hydrograph of The Average Natural Provo River as shown upon Plate I, and also hydrograph of the Average Natural Provo River 1889 to 1904 Inc.

The hydrograph 1889 to 1904 Inc. is platted from Tables 27, 28, 29, 30, 31, and 32. During this period the river was not compiled for each day, however, the line of discharge correctly represents the actual discharge, it is platted using the mean, the average minimum, and the average maximum, each of which is shown, and a true line drawn connecting the points, that is the space above the mean in each month is exactly the same as the space below the mean, and the area as shown is in acre feet equal to the same quantity as the mean acre feet.

PLATE III.

Plate III is mass diagram of Monthly Mean of The Average Natural Provo River 1905 to 1918 Inc. and Monthly Mean of Natural River 1889-1904 Inc. Observe the plate is made for comparative purposes and is graphic presentation of Table in center of page 3.

PLATE IV.

Plate IV is hydrographs of Natural Provo River for the years 1898 and 1918, and is platted to show comparison. Observe that in the discharge curve for 1898, especially in the normal flow, a tendency to straight lines for a considerable number of days, in this particular year the gage was read to tenths of a foot, the rating curve shows 30 c.f.s. per tenth of foot or approximately the same as the present station, so that the discharge curve as shown may be in some instances in error as great as 14 c.f.s., and the same discharge is shown as 200 c.f.s. when the actual discharge ranged between 186 and 214 c.f.s.

This plate is the graph of Tables 203 and 284, 285, 286, 287, 288.

PLATE VII.

Plate VII is Tree Graph of Provo River for August 25, 1915. The Natural Surface streams are shown upon the left in Orange, on the right is shown the inflow in Yellow. In both instances all diversions are assumed to be closed. In addition to the map scale the quantities are shown in figures, as for example "Deer Creek" with a discharge of 12 c.f.s. is given 12-46, meaning 12 c.f.s. plus the quantity above makes a total with this contribution of 46 c.f.s. At the bottom on line "Utah Valley is given the total of each class of water and the total discharge. In this illustration the storage and tunnel water has been omitted, the graph shows Provo River without Storage or Tunnel water, and with the diversions closed, from Wasatch Dam to Utah Valley.

PLATE XII.

Plate XII is topographic map of Provo River system, showing particularly Natural Streams and Diversion Headings. Included by courtesy of Utah Power & Light Company.

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PLATE XIII.

Plate XIII is sketch showing the Makeup of Provo River in the four section.

Runoff and Natural Streams color "Blue"

Returning waters,inflow, from runoff used in a section above color "RED"

Returning Waters,inflow, from two sections above color "Yellow"

Returning waters from three sections above; color "Green." That is following "Blue" in first section the seepage return as a contribution is shown in "Red" in the second section, and the seepage return after its use in second section is shown in third section in following month in "Yellow", and the seepage return after its use in the third section is shown in fourth section in following month in "Green". It is assumed that the waters entering the earth by deep percolation in the process of irrigations find their way back to the stream bed in about one month, and also some of the runoff applied in the early part of the season in the first section is use again, again, and again in its transit from the headwaters to Utah Valley.

This plate is platted from Table 12, observe on the Plate one combination is omitted to avoid confusion.

PLATE XIV.

Plate XIV is graphical presentation of the Precipitation at Provo, Utah, and Heber, Utah. It covers all the records at these station to September 30, 1918.

At the bottom is shown the total depth per month, the full line for Heber, the broken line, Provo.

At the top is shown the total depth for the years that are covered by a complete record, the same symbols are used for each station, and the scale shown on the left applies to both divisions of the Plate.

The heavy vertical lines occur between September 30 and October 1, and divide the record into "Seasonal Years" ending on September the 30th. The full line vertically across the Plate at the ending of the "Seasonal Year" 1904 divides the record into the two periods of comparison.

PLATE XV.

Plate XV is graphic plat of the average monthly precipitation at Heber, Utah, and Provo, Utah, for the periods of record as shown. The first period platted in full line and the second period in broken line.

Also at the right of each is shown the average annual precipitation in the two periods for each of the stations. The same depth scale applies to the four sections of the plate.

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BOX HYDROGRAPH:

The box hydrograph is composed of a number of hydrographs, on blueprints mounted on "Beaver Board" $5\frac{7}{16}$ inch in thickness. A base of $1\frac{1}{4}$ inch extends below the zero line of discharge, and the board is cut following the line of discharge curve and about $1/64$ of an inch above so that the line is not destroyed.

They are arranged in a wooden box with sufficient space left for additions, and for the purpose of keeping it up to date.

Beginning at the front they are as follows:

Plate VI"A"	Class "A" Rights Utah Valley.
Plate I	The Average Natural Provo River Utah Valley 1905-1918.
Plate VI	Typical Natural Provo River Utah Valley 1905-1918.
Plate XI	Median Natural Provo River Utah Valley 1905-1918.
Plate VIII A	Provo River 1898.
B	Average Provo River 1889-1904.
C	Natural Provo River 1905.
D	" " " 1906.
E	" " " 1907.
F	" " " 1908.
G	" " " 1909.
H	" " " 1910.
I	" " " 1911.
J	" " " 1912.
K	" " " 1913.
L	" " " 1914.
M	" " " 1915.
N	" " " 1916.
O	" " " 1917.
P	" " " 1918.

For purposes of comparison arrange as desired, and looking down the Average Natural Provo River 1905-1918 is "Red", The Typical "Blue"; The Median "Yellow"; Class "A" Rights "White"; and the Average 1889-1904, "Indigo".

Addendum:

- Plate XVIA Average Natural Provo River 1911-1918.
- Plate XVIB Typical Natural Provo River 1911-1918.
- Plate XVIC. Median Natural Provo River 1911-1918.

PROVO RIVER GAGING STATIONS.
CONDENSED.

STATION AT MOUTH OF CANYON.

ABSTRACT.

Designation "Station A"

This station was established and ~~observations~~ began July 27, 1889, by Samuel Fortier.

"The channel at this point is nearly straight for several hundred feet; the bottom of the river is rocky and does not appear to change. The bank on the North side is sufficiently high to confine all of the waters, but on the South side a rise of two feet above low water causes the stream to spread over a rocky bar. Measurements can be made with great accuracy during low water, but at times of flood the results are not so good. The station is equipped with a cable, tagwire, and boat, from which measurements are made. The gage is inclined. The benchmark is on a stone firmly bedded in a bank near the wagon road, about 100 feet Southwest of the gage. It is marked "B.M." in black paint, and is 6.95 feet above the zero of the gage.

It is located in the Canyon about six miles from the City of Provo, Utah. It is latitude $40^{\circ} 19'$ and longitude $111^{\circ} 40'$.

It is above the heads of most of the irrigating canals of Utah Valley.

A new gage was installed in 1903. "The diversion works of the company which develop power at the mouth of Provo Canyon for electric transmission to the mines West of Provo are located about five miles above the station. The Heber branch of the Denver and Rio Grande Railway passes within twenty feet of the new gage rod. The station is one-eighth mile above the county bridge. The old gage is an inclined rod set on the left bank. The new gage is a vertical aspen stick set on the right bank 90 feet northeast of the old gage. Both gages read 4.80 feet when the new gage was installed, but the zero of the new gage is 0.10 foot above the zero of the old gage. Discharge measurements are made by means of a cable and car located at the gage. Instead of using a tagged wire, the cable has been marked with white paint every three feet. The initial point for soundings is the first white mark on the cable south of the vertical post, which supports the cable on the right bank. The channel is straight for 200 feet above and for 100 feet below the station. The right bank is steep and rocky and has an elevation of about 10 feet above the zero of the gage. The left bank is sloping and has an elevation of about 7 feet above the zero of the gage. It is liable to overflow at flood stages. The bed of the stream is composed of boulders and is permanent. The current is swift and at flood stages has a velocity that is too high for accurate measurement. There is one channel up to the point where the river overflows the left bank. Above this stage there are two channels. The benchmark is a cross chiseled in a limestone rock about one foot square, which bears south 15° E. and is 100 feet distant from the old gage. Its elevation is 6.98 feet above the zero of the old (inclined) gage. The letters "B.M." are chiseled in the rock.

"1904" "B.M." noted above called No. 1. "Benchmark No. 2 is a United States Geological Survey standard benchmark plate cemented into the top of the south abutment of the highway bridge one-eighth mile southwest of the station. Its elevation is 4.75 feet above the zero of the gage. Benchmark No. 3 bears north $7^{\circ} 45'$ west 126 feet from the north post of the station. It is a cross chiseled on top of a boulder projecting about one foot above the ground. Its elevation is 11.21 feet above the zero of the gage.

PROVO RIVER GAGING STATIONS.

CONDENSED ABSTRACT.

(Continued)

1905:

"This station was established July 27, 1889. It is located about 6 miles north of Provo, about 1,000 feet above Olmstead Station, on the Provo Canyon Branch of the Rio Grande Western Railway, and 1,200 feet above the power house of the Telluride Power Company.

The station was originally established to determine the total flow of the Provo above all diversions to Utah Lake Valley; but since that time a small canal has been taken out about three miles above the station and the system of the Telluride Power Company has been extended by a new flume line of sufficient capacity to divert the entire normal flow of the stream. The power plant of the Telluride Power Company has been rebuilt at a point about 1,200 feet below the station, the tailrace discharging directly into the canals at the mouth of the canyon. Practically no water now passes the station except the flood discharge and a small portion of the side drainage between the power Company's dam and the gaging station, the greater part of the side drainage being diverted into the flume at various points along the line. The station is thus of little importance, but it is maintained at an extremely low cost, since the gage readings are made by the Telluride Power Company and the discharge curve is so well defined that but few more measurements are necessary.

Information in regard to this station is contained in the following publications of the United States Geological Survey. (Ann = Annual Reports; Bull = Bulletin; WS = Water Supply Paper.)

Descriptions: Ann 14, II, p 123; 18 IV, pp 325-326; Bull 131, p 59; 140, p 234; WS 16, p 162; 28, p 146; 38, pp 338-339; 51, p 416; 66, p 123; 85, p 88; 100, pp 140-141; 142-143; 133, pp 261-262. Discharge: Ann 18, IV, p 326; Bull 131, p 92; 140, p 234; WS 16, p 162; 28, p 329; 51, p 416; 100, p 141; 66, p 123; 85, p 88; 100, p 143; 133, p 262.

Discharge, Monthly: Ann 11, II, p 104; 12, II pp 354, 361; 13, III p 97; 14, II, pp 123-124; 18, IV, p 327; 19, IV, p 442; 20, IV, pp 458, 468; 21, IV, p 399; 22, IV, p 416; Bull 140, p 235; WS 75, p 195; 100, pp 142+144; 133, p 264.

Discharge yearly: Ann 13, III, p 99; 20, IV, p 61;

Gage Heights: Bull 131, p 60; 140, p 234; WS. 11, p 79; 16, p 162; 28, p 152; 38, p 339; 51, p 417; 66, p 124; 100, p 141; 143-144; 133, p 263;

Hydrographic: Ann 12, II, p 340; 14, II, p 125; 18, IV, p 328; 19, IV, p 468; 21, IV, p 399; 22 IV, p 417.

Rainfall and Runoff relation: Ann 20, IV, p 459.

Rating Tables: Ann 18, IV, p 326; 19, IV, p 441; Bull 131, p 59; 140, p 234; WS 28, p 154; 39, p 456; 52, p 521; 66, p 176; 100, p 144; 133, p 263;

Water Powers: Ann 19, IV, p 441.

This Station was established July 27, 1889, and was discontinued June 30, 1906.

PROVO RIVER GAGING STATIONS.

CONDENSED ABSTRACT.

(Continued)

STATION ABOVE TELLURIDE POWER COMPANY'S DAM.

Designation "Station B"

(Feb. 1, 1905, as later corrected)

This station was established March 1, 1905. It is located about three-fourths of a mile up the river from Upper Falls, a station on the Provo Canyon branch of the Rio Grande Western Railway, about four miles above the mouth of the canyon and 800 feet south of the canyon road, in J.W. Slick's pasture. It is about one-half mile above the Telluride Power Company's dam and above all diversions into Utah Lake Valley. The object of this station is the collection of data concerning the amount of water passing from the river into this valley.

The channel has a slight uniform curvature for about 200 feet above and 300 feet below the station, describing approximately the arc of a circle. Both banks are sufficiently high to prevent overflow; the left bank is formed by the Rio Grande Western Railway grade. The bed of the stream is composed of well compacted rock and soil, is comparatively smooth, and is not liable to shift, but a slight growth of moss occurs from it the time of spring flood until freezing weather. The velocity is low near the right bank, but increases uniformly to a point near the left. The discharge may vary from 100 to 1,400 second feet. Conditions of free flow exist except for a very short distance near the left bank.

Discharge measurements are made by means of a cable and Car. The cable is marked at four foot intervals, beginning at the north support, which is the initial point for soundings.

Daily gage readings are made, without expense to the Geological Survey, by the Telluride Power Company, the observations being under the direction of E.A. Briscoe, an engineer at the power house about four miles below the station. The gage is of the inclined type and consists of a 4-by-4 inch by 16-foot fir, bolted to a vertical cedar post embedded in the bank at the water's edge and to a boxelder stump at the shore end, about 25 feet upstream from the cable on the left bank. It is graduated with saw cuts and paint to read vertically. The gage is referred to bench marks as follows: (1) a 4-inch iron pipe with a metallic cap, set $3\frac{1}{2}$ feet in the ground at a point 12 feet from the north cable post, under a fence; this has an elevation of 7.31 feet above gage datum and is so stamped on the top. (2) A projecting point, marked with black paint, on a limestone ledge in a railroad cut about a foot above the track and 22 feet upstream from the line of the gage; elevation 17.18 feet above datum of gage.

1908:

"The station is below South Fork and all other tributaries and above all diversions into the Utah Lake Valley. Some water is diverted for irrigation in Heber Valley above the station.

Little ice forms at this station. The gage heights have been somewhat affected by backwater from the diversion dam below. This dam was raised about July 12, 1908, and the station had to be moved upstream a quarter of a mile, as near the forks as possible, but it is still too near the dam and results since that time have not been satisfactory.

Gage heights July 12, to 24, 1908, were affected by backwater from the diversion dam, and have been omitted. Gage heights for the two months previous are liable to be somewhat in error on this account. Gage heights for the new station above the old one beginning July 25.

PROVO RIVER GAGING STATIONS.

CONDENSED. ABSTRACT.

NEW STATION ABOVE TELLURIDE POWER COMPANY'S DAM.

Designation "Station C".

This station was established July 24, 1908, is below South Fork and all other tributaries and above all diversions into Utah Lake Valley. The Telluride Power Company's Dam was raised July 12, 1908, gageheights were thereafter affected by backwater and the station had to be moved upstream a quarter of a mile, as near the forks as possible,-- but it is still too near the dam and results since that time have not been satisfactory. Gageheights beginning July 25, 1908, are for the new station "C" above the old one, "B".

1910:

The most recent information regarding conditions at this station indicates that there is no backwater from the dam below but that the channel has become very unstable, requiring the use of many discharge curves. Results obtained at this station for 1909-1910 are not good.

1911:

Vertical staff installed June 15, 1909, by the Telluride Power Company, to replace vertical gage which was set July 24, 1908, and washed out June 14, 1909. Datum of gage set June 15, 1909, probably the same as that ~~was~~ of gage installed July 24, 1908, but there is no record to this effect. The gage installed Feb. 1, 1905, was an inclined staff on the left bank.

LOCATION: About 1 mile above Tellurid Power Company's dam, one-fourth mile below mouth of South Fork, and $1\frac{1}{4}$ miles below mouth of the North Fork, in the NW $1/4$ SW. $1/4$ Sec. 26, T.5 S., R.3 E..

RECORDS AVAILABLE: July 25, 1908, to December 31, 1911, when it was discontinued and new stations were established on the main river and the South Fork to obtain better conditions for measuring.

CHANNEL: One channel at all stages except at low water, when a bar near the left bank divides the current of the stream.

PROVO RIVER GAGING STATIONS

CONDENSED. ABSTRACT.

SOUTH FORK OF PROVO RIVER AT FORKS,UTAH.

Designation "Station D".

LOCATION: At Forks,Utah, 12 miles above Provo,in the NW. $\frac{1}{4}$ SE. $\frac{1}{2}$ Sec. 26, T. 5 S.,R. 3 E., at a point about 150 feet above the confluence of the South Fork with Provo River.

RECORDS AVAILABLE: Station established October 22,1911, records begun November 17,1911. The discharge of the South Fork added to that of the Provo River at Forks will give the total flow of Provo River available for diversion at the Telluride Power Company's dam.

DRAINAGE AREA: 30 square miles.

Gage: Vertical staff driven into the stream bed at the right bank 150 feet above the mouth and 40 feet southeast of the Denver and Rio Grande Railway tracks.

CHANNEL: Probably permanent;well defined control 30 feet below the gage composed of gravel and small boulders. One channel at all stages. The left bank is liable to overflow in extreme floods.

DISCHARGE MEASUREMENTS: Made by wading about 30 feet below the gage.

DISCONTINUED: June 14,1913.

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NEW STATION SOUTH FORK OF PROVO RIVER AT FORKS, UTAH.

Designation "Station E".

LOCATION: In the SE. $\frac{1}{4}$ Sec.26, T. 5 S., R 3 E., at Forks,about a quarter of a mile above confluence of South Fork with Provo River,and 12 miles up Provo Canyon from Provo,on highway and railroad from Provo to Heber.

GAGE: Vertical staff nailed to cottonwood tree on right bank, June 15,1913,

DISCHARGE MEASUREMENTS: Made from foot log or by wading.

CHANNEL AND CONTROL: One channel at all stages,both banks high and not likely to overflow,stream bed is composed of gravel and shifts occasionally.

RECORDS AVAILABLE: June 15,1913, to September 30,1918.

PROVO RIVER GAGING STATIONS:

CONDENSED ABSTRACT.

PROVO RIVER AT FORKS, UTAH.

Designation "Station F".

LOCATION: In the S.W. $\frac{1}{4}$ NE. $\frac{1}{4}$ Sec. 26, T. 5 S., R. 3 E., Salt Lake base and meridian, at Forks, Utah, 12 miles up Provo Canyon from Provo, Utah, on the highway and railroad from Provo to Heber, and about $1\frac{1}{2}$ miles above the dam of the Utah Power & Light Company. About 600 feet above the mouth of South Fork of Provo River, which enters on the left, and about 1 mile the mouth of North Fork, entering on the right.

RECORDS AVAILABLE: November 16, 1911, to October 6, 1915.

GAGE: Sloping gage on left bank, 10 feet upstream from cable.

CHANNEL: Velocity moderate and uniformly distributed across the section; bed of stream composed of small gravel and likely to shift during medium or high stages. One channel at all stages. Both Banks are fairly high and not liable to overflow.

DISCHARGE MEASUREMENTS: Made from cable and car, and by wading.

DISCONTINUED: October 6, 1915.

NEW STATION NEAR FORKS UTAH.

Designation "Station G".

LOCATION: In the NW $\frac{1}{4}$ Sec. 25, T. 5 S., R. 3 E., Salt Lake Meridian, between Forks and Wildwood, Utah. 12.5 mile up Provo Canyon from Provo, Utah, on the highway and railroad from Provo to Heber, and two miles above the dam of the Utah Power & Light Company. About 2000 feet below the mouth of North Fork which enters on the right, and 3000 feet above the mouth of the South Fork which enters on the left, and 2,500 feet above "Station F". On the right bank of stream and near toe of slope of highway grade, under boxelder tree.

RECORDS AVAILABLE: October 6, 1915 to September 30, 1918.

STATION ESTABLISHED: October 6, 1915.

GAGE: Vertical staff, standard, porcelain enamel.

CHANNEL: Good control, bed not liable to change, banks sufficiently high to prevent overflow.

MEASUREMENTS: Made some distance below gage, by wading, and by cable and car during flood periods at "Station F".

PROVO RIVER GAGING STATIONS .

CONDENSED ABSTRACT.

S U M M A R Y .

STATION:	LOCATION:	ESTABLISHED.	DISCONTINUED.	RECORDS AVAILABLE.
"Station A"	At Mouth Canyon.	July 27,1889.	June 30,1906.	July 27,1889- June 30,1906.
"Station B"	One-half Mile Above Telluride Power Co. Dam.	Feb.1,1905.	July 12,1908.	Feb.1,1905- July 12,1908.
"Station C".	Three Fourths Mile Above Telluride Power Co.Dam.	July 24,1908.	Dec. 31,1911.	July 25,1908- Dec.31,1911.
"Station D"	South Fork, 150 Feet above Mouth.	Oct.22,1911.	June 14,1913.	Nov.17,1911- June 15,1913.
"Station E"	South Fork, One- fourth mile above mouth.	June 15,1913.	Present Stat- ion.	June 15,1913- Sept.30,1918.
"Station F"	Provo River at Forks,Utah.	Nov.16,1911.	Oct.6,1915.	Nov.17,1911- Oct.6,1915.
"Station G"	Provo River one- half mile above Forks,Utah.	Oct.6,1915.	Present Stat- ion.	Oct.6,1915- Sept.30,1918.

G R A P H I C .

"A"	"B"	"C"	"D"	"E"	"F"	"G"
7-27-89						
	2-1-1905					
6-30-06	7-12-08					
		7-25-08				
			11-17-11		11-17-11	
		12-31-11				
			6-15-13	6-15-13		
					10-6-15	10-6-15
				2-29-18		
				To Date		To Date.

CONDENSED SUMMARY.

Average Natural Provo River In The Utah Valley 1905 To 1918 Inc.

	April	May	June	July	August	September.
Total	19457	27847	32582	14952	10157	10374
Maximum	797	1071	1402	715	356	359
Minimum	496	680	743	352	313	329
Mean	648	898	1086	482	328	346
Average of Maxima				757	391	408
Average of Minima				338	297	300
Acre Feet	38914	55694	65164	29904	20314	20748

Total Acre feet in the Six Months Period 230,738.

Typical Natural Provo River In The Utah Valley 1905 to 1918 Inc.

	April	May	June	July	August	September.
Total	17565	24815	28369	13841	9863	9992
Maximum	703	949	1117	620	336	338
Minimum	465	630	713	342	308	324
Mean	585	800	945	446	318	333
Acre Feet	35130	49630	56738	27682	19726	19984

Total Acre Feet in the Six Months Period 208,890.

Median Natural Provo River In The Utah Valley 1905 To 1918 Inc.

	April	May	June	July	August	September.
Total	18570	26565	27999	11731	9957	10159.
Maximum	791	1055	1217	468	366	374
Minimum	482	677	492	337	303	308
Mean	619	857	933	378	321	339
Acre Feet	37140	53130	55998	23462	19914	20318

Total Acre Feet In The Six Months Period 209,962.
